

## PROVIDING INFORMATION TO USERS OF A TRANSPORTATION SYSTEM USING AUGMENTED REALITY ELEMENTS

### BACKGROUND

[0001] Transportation services (e.g., ride share services, taxi services, etc.) provide a way for users to travel from one place to another with relative ease. For example, ride share services enable users to request transportation from nearly any location and at almost any time, without relying on a bus schedule, navigating to a subway station, or even owning a vehicle. To illustrate, a ride share service enables a user to request a driver for roadside pickup and transportation to a desired destination, then matches and assigns a driver for the user based on location and other factors to quickly and efficiently transport the user. With the advent of smartphones, requesting a driver or hailing a taxi is much simpler than before. For instance, a user can utilize a mobile application to request a driver, and, via the location information associated with the smartphone, a nearby driver can accept the request, pick up the user, and deliver the user to a desired destination more efficiently than in times past. However, while conventional transportation systems do provide some benefits, conventional transportation systems nonetheless suffer from disadvantages.

[0002] For example, conventional systems sometimes result in a pickup/drop-off experience that is inefficient, confusing, and difficult. For example, by merely providing simplified map information regarding route progress, pickup/drop-off location, status of arrival at a destination, and other similarly generalized information, conventional systems frustrate drivers and passengers alike as to how to most effectively navigate on a more micro scale—i.e., on a more detailed level than a location on a roadmap. To illustrate, large cities frequently have more complicated roads with multiple lanes, accompanying sidewalks with pedestrians, traffic signals, bike lanes, train tracks, etc. Also, pedestrians, bikers, and/or other drivers often fail to comply with traffic laws and act unpredictably to a conventional system. However, conventional transportation systems sometimes fail to properly account for these complexities when providing information and instructions to passengers and drivers.

[0003] These and other disadvantages exist with regard to conventional transportation systems.

### SUMMARY

[0004] The present application discloses various embodiments of improved transportation systems and corresponding processes. Specifically, the present application discloses systems and methods for using augmented reality (“AR”) experiences based on historical data to provide information and instructions to users (passengers and drivers) of transportation systems. As one example and as will be explained in more detail below, the systems and methods described herein generate three-dimensional virtual objects (e.g., augmented reality elements) to overlay on a user’s view of real-world surroundings to assist in a pickup or drop-off process.

[0005] To illustrate, the systems and methods described herein collect, compile, and analyze information from past “rides” taken by passengers of a transportation system (a transportation network or rideshare system) to build a data-

base of historical ride information. Based on the historical ride information, the disclosed systems are able to, for example, identify an ideal pickup location for a waiting passenger in accordance with the passenger’s location, the driver’s location, location traffic conditions, location transportation restrictions, etc. After identifying the ideal pickup location, the disclosed systems provide an AR experience to the waiting passenger by providing an AR element representing the ideal pickup location within the passenger’s view of the real world (e.g., displayed by an AR device worn or held by the passenger), as will be explained in more detail below. In addition, the disclosed systems can provide additional AR elements representing, for example, a driver’s location, a “no pickup” location, or to indicate any other information relevant to the pickup process. Furthermore, the disclosed systems can provide similar AR experiences to drivers to aid in the pickup or in a drop-off process. By providing an AR experience to assist in the pickup/drop-off processes, the disclosed systems are able to provide users (both riders and drivers) with a more efficient, enjoyable, and well-informed transportation experience.

[0006] Additional features and advantages of the present application will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by the practice of such example embodiments.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0007] This disclosure will describe one or more embodiments of the invention with additional specificity and detail by referencing the accompanying figures. The following paragraphs briefly describe those figures, in which:

[0008] FIG. 1 illustrates a schematic diagram of an example environment of an augmented reality transportation system in accordance with one or more embodiments;

[0009] FIG. 2 illustrates a sequence diagram for presenting an augmented reality pickup element in accordance with one or more embodiments;

[0010] FIG. 3 illustrates a sequence diagram for presenting an augmented reality pickup element in accordance with one or more embodiments;

[0011] FIG. 4 illustrates a sequence diagram for presenting an augmented reality drop-off element in accordance with one or more embodiments;

[0012] FIG. 5 illustrates an example augmented reality environment from a passenger perspective in accordance with one or more embodiments;

[0013] FIG. 6 illustrates an example augmented reality environment from a passenger perspective in accordance with one or more embodiments;

[0014] FIG. 7 illustrates an example augmented reality environment from a driver perspective in accordance with one or more embodiments;

[0015] FIG. 8 illustrates an example augmented reality environment for a drop-off route in accordance with one or more embodiments;

[0016] FIG. 9 illustrates a flowchart of a series of acts in a method of providing an augmented reality pickup element in accordance with one or more embodiments;

[0017] FIG. 10 illustrates a flowchart of a series of acts in a method of providing an augmented reality drop-off element in accordance with one or more embodiments;

[0018] FIG. 11 illustrates a block diagram of an exemplary computing device in accordance with one or more embodiments; and